

Application No.: 10/776,104
Amendment Dated: May 27, 2005
Reply to Office Action of: February 10, 2005

REMARKS

Claims 2-4 have been cancelled, without prejudice.

Claim 5 has been amended to depend from claim 1.

Claim 1 has been amended as set forth above. Support for these amendments is found in original claim 12 and in the specification at, for example, page 3, lines 3-15. See *In re Gardner*, 177 USPQ 396, 397 (CCPA 1973) and MPEP §§ 608.01(o) and (l).

Claims 6-11 have also been amended to replace “desired property” with “improved specific activity.” Support for these amendments is found in original claim 12 and in the specification at, for example, page 3, lines 3-15. (*Id.*).

Claim 25 has been added and recites the “process according to claim 1, wherein the DNA sequence encoding the modified *Aspergillus* phytase has been changed at a position corresponding to position 27 of the phytase of *Aspergillus niger* (SEQ ID NO:1) to an amino acid selected from the group consisting of Ala, Val, Leu, Ile, Thr, Gly, and Asn.” Support for claim 25 is found in original claim 12 and in the specification at, for example, page 3, lines 3-15 and lines 20-23. (*Id.*).

Claim 26 has been added and recites “[a] process according to claim 25, wherein the DNA sequence encodes at least one additional mutation selected from the group consisting of S66D, S140Y, D141G, A205E, Q274L, G277D, G277K, Y282H, and N340S.” Support for claim 26 is found in original claims 14-15 and in the specification at, for example, page 3, lines 3-15, and lines 20-26. (*Id.*).

It is submitted that no new matter has been introduced by the foregoing amendments. Approval and entry of the amendments respectfully is requested.

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We thank the Examiner for her acknowledgement of the claim for priority based on EP 97810175.6 filed on March 25, 1997. (Paper No. 02022005 at 2). In this regard, we note that the section in the Office Action captioned "Continuation of prior application" is unclear. A claim for benefit of the related prior filed applications (*i.e.*, U.S. Serial Nos. 10/062,848, now U.S. Patent No. 6,734,004 and 09/044,718, now U.S. Patent No. 6,391,605) was already made in the application transmittal papers, which was acknowledged in the Filing Receipt. Moreover, the application transmittal letter, at paragraph 5, instructed that the specification be amended to reflect the claim to benefit. If the Examiner objects to the manner in which the specification was amended, it is respectfully requested that she clearly do so in the next Office Action. We assume, however, that Applicants claim to U.S. and foreign priority has been perfected.

§112, First Paragraph Rejections

1. Written Description

Claims 1-11 have been rejected under 35 U.S.C. §112, first paragraph. (Paper No. 02022005 at 2-3). In making the rejection, the Examiner asserted that claims 1-11 "contain subject matter which was not described in specification" (*Id.* at 2). The Examiner further asserted that "[t]here is no disclosure of any particular structure to function/activity relationship in the single disclosed phytase species to other phytase species where such sequences are conserved in order to establish a relationship among species or modify the enzyme to have any desired property such as for example, a broader pH profile, increased thermostability, etc. The specification also fails to describe additional representative species of these phytases by way of 3-D structures which can be modeled using the 3-D structure of *Aspergillus niger* as the

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template which may then be used for modifying any unmodified phytase irrespective of their homology to the template, and to any desired property.” (*Id.*)

Initially, we note, with a view towards furthering prosecution, claim 1 has been amended to recite “[a] process for preparing a modified *Aspergillus* phytase ***with a specific activity improved over the specific activity of an unmodified Aspergillus phytase***” Claims 6-11 have also been amended to specifically refer to the “improved specific activity” property.

As is well accepted, there is a ***strong presumption*** that an adequate written description of the claimed invention is present in an application as filed. See *In re Werthheim*, 191 USPQ 90, 97 (CCPA 1976); and MPEP §2163(II)(A). Further, an applicant may show possession of the claimed invention by describing it using descriptive means such as, for example, words, structures, figures, diagrams and formulas. See MPEP §2163(I). Moreover, a proper written description analysis requires an analysis of the understanding of an ordinarily skilled artisan at the time of the invention. See MPEP § 2163(II)(A)(2); see also *Wang Labs. v. Toshiba Corp.*, 26 USPQ2d 1767, 1774 (Fed. Cir. 1993).

As amended, the claims recite ***specific process steps*** for preparing “a modified *Aspergillus* phytase ***with a specific activity improved over the specific activity of an unmodified Aspergillus phytase***.” Support for these amendments is found virtually *in haec verba* in the specification. (See original claim 12 and the specification at, for example, page 3, lines 3-15). Thus, in view of these amendments, it is respectfully submitted that the claims fully satisfy the written description requirement.

Moreover, although not believed necessary in view of the foregoing, we note the specification provides ample disclosure sufficient to inform a skilled artisan that the Applicants were in possession of the currently claimed process. In this regard, we note that the specification describes 10 examples and discloses over 26 figures that provide instruction on how to carry out the claimed process and demonstrate that Applicants were in possession of the claimed process. For example, the specification discloses (1) a ***specific group*** of phytases, namely *Aspergillus* phytases, (2) a specific trait to improve -"specific activity"-, and (3) ***specific process steps*** used for preparing such a modified phytase. (See, e.g., Specification at pages 9-12, Examples 1, 3, and 7, and Table 3).

Furthermore, Example 7 discloses assays for determining phytase activity and specific activity, which is the same "desired property" now recited in claim 1. Also, Example 8 discloses an alternative approach to obtain phytases with modified characteristics and examines the natural variation found in phytase characteristics within a certain species (*i.e.*, *Aspergillus fumigatus*). (See Specification at page 11, line 26 to page 12, line 4 and Example 8). Further, Example 1 discloses a homology model of *Aspergillus fumigatus* and *Aspergillus terreus*. And, Examples 2-6 disclose how to construct and express modified phytases having "improved specific activity."

In addition, Figure 1 provides nucleotide sequences for three phytase species, and Figures 4-7 provide the complete coding sequences for four different phytase species. Figures 3, 9, 21, and 25 provide substrate specificities for a large number of wild type and mutant phytases.

In view of the foregoing, it is respectfully submitted that the rejection has been rendered moot and should be withdrawn.

2. Enablement

Claims 1-11 have been rejected under 35 U.S.C. §112, first paragraph, for lack of enablement. (Paper No. 02022005 at 4). In making the rejection, the Examiner asserted that the specification “does not reasonably provide enablement for modifying **any** phytase having **any** desired property based upon the steps of a-e of claim 1.” (*Id.*) (Emphasis added).

The Examiner relied on Mosimann *et al.*, Proteins: Structure, Function & Genetics, 23 :301-317 (1995) (“Mosimann”) as an example of the state of the art. (*Id.* at 5). Apparently, the Examiner interpreted Mosimann to conclude that in molecular modeling when sequence identity between the target and the template is less than 70% that such 3-D models are “unpredictable.” (*Id.*).

The Examiner also asserted that “a number of phytases from diverse microorganisms display a range of sequence homologies between target and the template [*Aspergillus niger*] insufficient to provide a quality model of the 3-D structure and unreliable for using it in a process for the production of modifying any phytase. Additional unpredictability in the method is due to modifying any phytase for a desired property, which may be, for example, high specific activity, broader pH profile, thermostability, etc., and must be optimized for the diverse phytases, which without sufficient guidance will lead to unpredictability.” (*Id.*). The Examiner acknowledged, however, that the specification is “enabling for a method (or process) of modeling the

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production of a modified *Aspergillus fumigatus* phytase having the potential for improving a desired enzymatic property” (*Id.* at 4.)

With a view toward furthering prosecution, claim 1 has been amended to recite “[a] process for preparing a modified ***Aspergillus phytase with a specific activity improved over the specific activity of an unmodified Aspergillus phytase*** which comprises” Claims 6-11 have also been amended to recite that the desired property is “improved specific activity.”

Thus, the claims, as amended, recite a specific group of phytases - “*Aspergillus* phytases”- as well as a specific “desired property” - “improved specific activity.” With these amendments, it is respectfully submitted that the Examiner’s concerns regarding the scope of claim 1, *i.e.*, modifying “any” phytase having “any” desired property are rendered moot.

In this regard, we note, as stated above, that the specification provides over 26 figures and 10 examples that provide ample instruction on how to carry out the claimed process. For example, Figure 1 provides nucleotide sequences for three phytase species, and Figures 4-7 provide the complete coding sequences for four different phytase species. Figures 3, 9, 21, and 25 provide substrate specificities for a large number of wild type and mutant phytases. Example 7 discloses assays for determining phytase activity and specific activity, the same “desired property” now recited in claim 1. And, the specification further discloses a homology model (Example 1) and how to construct and express modified phytases having the desired property, *i.e.*, “improved specific activity.” (See Examples 2-6).

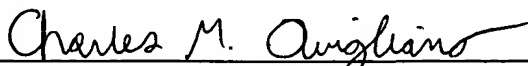
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In view of the disclosure in the specification of how to carry out the claimed process, including how to make and express a modified *Aspergillus* phytase with an improved specific activity, and assays for identifying modified *Aspergillus* phytases with improved specific activities, as well as the significant skill in the art exemplified by the specification and documents identified therein, it is respectfully submitted that one skilled in the art could carry out the claimed process without undue experimentation.

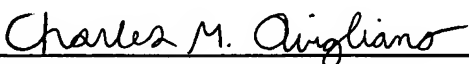
For the reasons set forth above, it is respectfully submitted that the rejection has been rendered moot and should be withdrawn.

Accordingly, for the reasons set forth above, entry of the amendments, withdrawal of all rejections, and allowance of all claims are respectfully requested. If the Examiner has any questions regarding this paper, please contact the undersigned.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on May 27, 2005.


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Respectfully submitted,

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